UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/839,690	04/20/2001	Robert C. Keller	TI-31429	1790

23494 7590 04/05/2005

TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER	
SINGH, DALZID E	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/839,690	KELLER ET AL.	
	Examiner	Art Unit	
	Dalzid Singh	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,7,8,10,12-20 and 22-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,7,8,10,12-20 and 22-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 10 and 22 are objected to because of the following informalities: Claims 10 and 22 are depending on a cancelled claims 25 and 21 respectively. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, 8, 10, 12-15, 17-20 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al (US Patent No. 5,786,923) in view of Mihota (US Patent No. 6,623,187).

Regarding claim 1, Doucet et al disclose telecommunication network comprising:

an optical module including a plurality of optical receivers, each optical receiver configured to receive an optical wireless signal, which share a common property selected from the group consisting of optical wavelength, polarization, multiplexing and sub-carrier modulation (as shown in Fig. 3, Doucet et al show plurality of transceiver units optically coupled to optical router (110), which comprised of transceiver (transmitter and receiver) units (800A to 800M) as shown in Fig. 4; property of the signal are selected from: optical wavelength (since the transceiver communicates

optically, therefore the signal comprise of optical wavelength); polarization (see col. 18, lines 48-51); and multiplexing (see col. 5, lines 6-11 and col. 6, lines 18-41)), wherein different ones of the optical receivers are aligned with adjacent receivers to have different fields of view such that each incoming optical wireless signal cannot be viewed at the same time by two receivers having overlapping field of view (as shown in Fig. 4, Doucet et al show different receivers, such as 800A and 800M, which have different filed of views such that each incoming optical wireless signal cannot be viewed at the same time by two receivers having overlapping field of view); and,

processor circuitry (for example 795), which is found in optical router shown in Fig. 4, coupled to the plurality of optical receivers (optical receiver is part of the optical transceivers connected to 800A to 800M), the processor circuitry receiving electrical signals derived from the optical wireless signals (since the receiver comprise of photo-diode, see col.17, lines 5-9, therefore the optical wireless signal is converted to electrical signal to be processed by circuitries (795)).

Doucet et al telecommunication network for transmitting and receiving optical signal having common property, as discussed above, including modulation (see col. 4, lines 57-62) and differ from the claimed invention in that Doucet et al do not specifically disclose the modulation is a sub-carrier modulation. However, such modulation use in wireless communication is well known. Mihota is cited to show such well known concept. In col. 12, lines 8-14, Mihota discloses wireless optical communication system which uses sub-carrier modulation. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide

modulation such as sub-carrier modulation as taught by Mihota to the telecommunication system of Doucet et al. One of ordinary skill in the art would have been motivated to provide sub-carrier modulation in order to increase transmission bandwidth.

Regarding claim 5, in col. 8, lines 20-23, Doucet et al teach that the receiver, within the optical router, used gratings (i.e., filter) so that the receiver can receives optical signals within a limited range of wavelengths.

Regarding claim 8, as discussed above, Doucet et al teach the use of time-multiplexed to transmit and received the signal, which enabled and disabled the receiver over time such that each optical receiver can receive no more than one of the unique optical wireless signals (see col. 5, lines 6-11 and col. 6, lines 18-41, the optical wireless signal (beam) could be transmitted in time-multiplexed (i.e., time slots), frequency multiplexed or code multiplexed fashion, which contain timing information to instruct the transceiver as when to transmit, which indicate when to receive the transmitted signal.

Regarding claim 10, as cited in col. 7, lines 36-47, Doucet et al teach that the unique optical wireless signals includes a modulated sub-carrier signal and wherein each of the optical receivers is configured to receive source information from the modulated sub-carrier signal (Doucet et al teach the use of modulated signal; modulated or encoded signal comprises of data signal (i.e., information signal) and carrier signal).

Regarding claim 12, Doucet et al teach that the processor circuitry comprises a digital signal processor (in col. 6, lines 31-41, Doucet et al teach the use of master clock to compute timing information, which is a digital signal processor).

Regarding claim 13, as shown in Fig. 4, Doucet et al show microcontroller (for example, control system 795 contain a microcontroller for controlling or deflecting beam).

Regarding claim 14, as shown in Fig. 7, Doucet et al show optical elements (230, 240, 261, 262, 380) as an interface unit comprises a physical layer device (i.e., lenses).

Regarding claim 15, Doucet et al disclose telecommunication network comprising:

a first optical wireless receiver having a photodetector with a first field of view for receiving a first optical wireless signal from a first remote source having a first property selected from the group consisting of optical wavelength, polarization, multiplexing and sub-carrier modulation (as shown in Fig. 3, Doucet et al show plurality of transceiver units optically coupled to optical router (110), which comprised of transceiver (transmitter and receiver) units (800A to 800M) as shown in Fig. 4, any transceiver such as 800A, can be considered as first optical wireless receiver; see col. 17, lines 5-9 and shown in Fig. 7, Doucet et al teach the use of photodiode in the receiver; property of the signal are selected from: optical wavelength (since the transceiver communicates optically, therefore the signal comprise of optical wavelength); polarization (see col. 18, lines 48-51); and multiplexing (see col. 5, lines 6-11 and col. 6, lines 18-41));

a second optical wireless receiver having a photodetector with second field of view (transceiver, which receiver, connected to 800B or 800M, can be considered as second optical wireless receiver; and see col. 17, lines 5-9 and shown in Fig. 7, Doucet et al teach the use of photodiode in the receiver; and

processing circuitry (795) coupled to the first and to the second optical wireless receivers (the receivers are within transceiver units connected to 800A and 800B or 800M), the processing circuitry receiving first data from a first remote source and second data from a second remote source (for example, subscriber transceiver units are remote sources), the first data being received through the first optical wireless receiver and the second data being received through the second optical (see col. 7, lines 60-67 to col. 8, lines 1-12).

Doucet et al telecommunication network for transmitting and receiving optical signal having common property, as discussed above, including modulation (see col. 4, lines 57-62) and differ from the claimed invention in that Doucet et al do not specifically disclose the modulation is a sub-carrier modulation. However, such modulation use in wireless communication is well known. Mihota is cited to show such well known concept. In col. 12, lines 8-14, Mihota discloses wireless optical communication system which uses sub-carrier modulation. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide modulation such as sub-carrier modulation as taught by Mihota to the telecommunication system of Doucet et al. One of ordinary skill in the art would have

been motivated to provide sub-carrier modulation in order to increase transmission bandwidth.

Regarding claim 17, in col. 8, lines 20-23, Doucet et al teach the use of gratings (i.e., wavelength filter).

Regarding claim 18, Doucet et al disclose telecommunication network comprising optical wireless communication device, as discussed above, further comprises:

a transmitter, part of the transceiver system as disclosed above;

a source of light having a beam of light (as shown in Fig. 4, Doucet et al show beams of light coming out of the transceiver connected to 800A, 800B or 800M);

a controllable beam steering device (see col. 22, lines 14-19, Doucet et al teach rotating the optical antenna (i.e., beam steering device) to search for other transceivers); and

an actuator to permit steering said light beam, the beam steering device being controllable by predetermined control signals (as discussed above, optical antenna can be rotated (i.e., steer) to search for other transceivers, therefore there must be actuators to turn and control movement of the antenna).

Regarding claim 19, as shown in Fig. 4, Doucet et al show plurality of additional optical receivers, at least some of the additional optical receivers having a photodetector with said first field of view (see col. 17, lines 5-9).

Regarding claim 20, Doucet et al disclose telecommunication network, as shown in Fig. 3, comprising:

receiving a first optical wireless signal from a first property (optical router (110) received first optical wireless signal from first source (for example, 130A)) selected from the group consisting of optical wavelength, polarization, multiplexing and sub-carrier modulation (as shown in Fig. 3, Doucet et al show plurality of transceiver units optically coupled to optical router (110), which comprised of transceiver (transmitter and receiver) units (800A to 800M) as shown in Fig. 4, any transceiver such as 800A, can be considered as first optical wireless receiver; see col. 17, lines 5-9 and shown in Fig. 7, Doucet et al teach the use of photodiode in the receiver; property of the signal are selected from: optical wavelength (since the transceiver communicates optically, therefore the signal comprise of optical wavelength); polarization (see col. 18, lines 48-51); and multiplexing (see col. 5, lines 6-11 and col. 6, lines 18-41));

receiving a second optical wireless signal from a second source (optical router (110) received second optical wireless signal from second source (for example, 130B)); and,

distinguishing between the first optical wireless signal and the second optical wireless signal (in col. 7, lines 36-67, Doucet et al teach method of distinguishing between different users and in col. 8, lines 1-12, 20-30, Doucet et al teach the use of grating to distinguish between different signals (i.e., wavelengths)).

Doucet et al telecommunication network for transmitting and receiving optical signal having common property, as discussed above, including modulation (see col. 4, lines 57-62) and differ from the claimed invention in that Doucet et al do not specifically disclose the modulation is a sub-carrier modulation. However, such modulation use in

wireless communication is well known. Mihota is cited to show such well known concept. In col. 12, lines 8-14, Mihota discloses wireless optical communication system which uses sub-carrier modulation. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide modulation such as sub-carrier modulation as taught by Mihota to the telecommunication system of Doucet et al. One of ordinary skill in the art would have been motivated to provide sub-carrier modulation in order to increase transmission bandwidth.

Regarding claim 22, the combination of Doucet et al and Mihota, as shown in Fig. 4 of Doucet et al, shows transceivers connected to 800A or 800B or 800M in a circular fashion and differ from this claim in that Doucet et al do not indicate that the second field of view being at least five degrees out of line with the first field of view. However, as shown in the figure, Doucet et al clearly show separation between the transceivers' field of view. Based on this teaching, it would have been obvious to an artisan at the time of the invention to adjust the field of view of the transceivers to be at least five degrees. Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Minning and Mfg. Co. v. Coe, 69 App D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App D.C. 324, 135 F.2d 11, 57 USPQ 136. In addition, discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Antonie*, 559 F.2d 239, 618, 195 USPQ 6

(CCPA 1977); *In re Aller,* 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). See also *In re Aller,* 105 USPQ 233 (CCPA 1955) and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to set the field of view to an optimum or workable value or range by routine experimentation.

Regarding claim 23, as cited in col. 8, lines 21-23, Doucet et al teach the use of grating to separate different wavelengths (i.e., at least two wavelengths).

Regarding claim 24, as cited in col. 18, lines 48-51, Doucet et al teach that the first optical wireless signal (first light beam) has a first polarization and the second optical wireless signal (second light beam) has a second polarization, the second polarization being substantially orthogonal to the first polarization.

4. Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al (US Patent No. 5,786,923) in view of Mihota (US Patent No. 6,623,187) and further in view of Kennedy (US Patent No. 5,121,242).

Regarding claim 7, the combination of Doucet et al and Mihota discloses telecommunication network which received orthogonal polarized beams (see col. 14, lines 21-24 of Doucet et al) which include two states of polarization (for example, trans electric (TE) and trans magnetic (TM) which are orthogonal with respect to the other). The combination differs from this claim in that the combination does not teach that some of the optical receivers include a filter that only passes a first polarization of light and others of the optical receivers include a filter that only passes a second polarization of light, the first polarization being substantially orthogonal to the second

polarization. However, Kennedy, in col. 4, lines 58-62, teaches the use of polarized filter having a wave plate that transmit (passes) light having a predetermined angle of polarization (for example, first polarization which could be in TE mode of polarization) and block light having polarization perpendicular (orthogonal) to this angle of polarization (for example, second polarization which is in TM mode of polarization). Since Doucet et al teach that the receivers within the optical router, as shown in Fig. 4, received plurality of different wireless optical signals from all directions, therefore it would have been obvious to provide a polarization filter, as taught by Kennedy, to the receivers of the combination of Doucet et al and Mihota in order to receive a desired optical wireless signal having a particular polarization state. One of ordinary skill in the art would have been motivated to provide such filter in order to eliminate or reduce signal interference, such as crosstalk, that occur between different optical wireless signals.

Regarding claim 16, as discussed above, the combination teaches the use of a polarization filter (i.e., polarized filter which distinguish among different polarization states).

Response to Arguments

5. Applicant's arguments filed 12 January 2005 have been fully considered but they are not persuasive.

Applicant argues that the reference, Doucet et al, does not teach limitation of claim 1 which recites, "...adjacent receivers have different fields of view such that each

incoming optical wireless signal can not be viewed at the same time by two receivers having overlapping field of view;" In support of such limitation applicant refers to Fig. 4 of applicant's drawings. Fig. 4 of the drawing shows plurality of receivers. Receiver (120) and receiver (122) are separated at a distance (128) in which first incoming light (124) and second incoming light (126) are received, respectively. As shown in Fig. 4, the first incoming and second incoming light do not overlap. However, it is well known that optical beam transmitted from a source will spread and increase its diameter over distance traveled. For example, if two beams transmitted in parallel from same location, each of the beam will spread over the distance traveled and will result in overlapping. The distance (128) separating receiver (120) and receiver (122) provides that the receivers have a non-overlapping filed of view and are not adjacent. However, according to claim 1, the receivers have overlapping field of view. Based on this, it appears that limitation of claim 1 is contradictory.

As shown in Fig. 4, the reference, Doucet et al shows plurality of transceivers, which comprise of transmitters and receivers, coupled to transmission lines (800A to 800M). For example, first receiver coupled to transmission line (800A) receives first incoming signal which do not have an overlapping view of last receiver coupled to transmission line (800M) which receives a second incoming signal from a different location. Since the receivers are located at opposite locations, therefore the receivers do not have overlapping field of view. The incoming signal received by first receiver does not overlap the incoming signal received by the last receiver. Therefore, based on this, the reference still reads on limitation of claim 1.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272--3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DS
March 31, 2005

M. R. Sedighian

M. R. SEDIGHIAN
PRIMARY EXAMINER